



Formulation Development of Oral Timed-Release Press-Coated Tablets: Optimization and *In Vivo* Studies

Chikkanna NARENDRA ^{1,*} & Mayasandra S. SRINATH ²

¹ Dept. of Pharmaceutics, Visveswarapura Institute of Pharmaceutical Sciences, Bangalore, India.

² Dept. of Pharmaceutics, SET'S College of Pharmacy, Dharwad, India.

SUMMARY. The objective of the present study was to develop an oral timed-released press-coated tablet containing theophylline as a model drug. A D-optimal design of experiment was employed to systematically study the effect of ternary blend of ethylcellulose (X_1), hydroxypropylcellulose (X_2), and Mg stearate (X_3) as independent variables. The design was quantitatively evaluated by quadratic model and the results from the statistical analysis revealed that interaction factors X_1X_2 and X_2X_3 were found to be highly significant on the studied response variables; percent drug release at 8 h (Y_1), percent drug release at 10 h (Y_2) and lag time (Y_3). A numerical optimization technique by desirability function was used to optimize the response variables each having a different target and the observed responses were highly agreed with experimental values. The dissolution profiles of the optimal formulation before and after stability studies were evaluated by using similarity factor (f_2) and were found to be similar. The results of *in vivo* studies showed an increased T_{max} and MRT values with high statistical significant difference between optimal press-coated and core tablets. The time point at which the drug first appeared in the plasma for the optimal press-coated tablet was found to be longer than that of core tablet, indicating a time controlled release profile. Moreover, a good linear relationship was observed between the fraction dissolved and fraction absorbed.

KEY WORDS: D-optimal design, *In vivo* studies, *In vitro-in vivo* correlation, Optimization, Press-coated tablets, Stability studies.

* Author to whom correspondence should be addressed. E-mail: narendragcp@rediffmail.com